

Listing of Claims

1. (Previously Presented) A composition comprising:
ribbons, fibrils or fibres, wherein each of the ribbons, fibrils or fibres has an antiparallel arrangement of peptides in a β - sheet tape-like substructure at physiological pH, wherein each peptide comprises a net -2 or a +2 charge, and wherein the peptide is P11-3; and
sodium chloride concentration equal to or about 145 mM,
wherein the composition is at a physiological pH, and wherein the peptide is present at a concentration of greater than 15 mg/ml in the composition.
2. (Cancelled)
3. (Currently Amended) The ~~material~~ composition ~~to~~of claim 1, wherein the ~~material~~ composition comprises a self assembling peptide (SAP)) or pair of complementary SAPs, wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.
4. (Previously Presented) The composition according to claim 3, wherein the ratio of total amino acids to net charged amino acids is from 11:1 to 11:3.
5. (Previously Presented) The composition according to claim 3, wherein the polar/neutral amino acids comprise glutamine, serine, asparagine, glutamic acid, ornithine, cysteine, lysine, histidine or threonine.
6. (Previously Presented) The composition according to claim 3, wherein the amino acids are positively charged and form a gel at a pH of less than or equal to a neutral pH.
7. (Previously Presented) The composition according to claim 3, wherein the amino acids are negatively charged and form a gel at a pH of greater than or equal to a neutral pH.
8. (Canceled)

9. (Previously Presented) The composition according to claim 3, wherein the amino acid chain is extended to include a bioactive peptide sequence.

10. (Previously Presented) The composition according to claim 3, wherein the amino acid chain is attached to a therapeutically active molecule.

11. (Previously Presented) The composition according to claim 1, wherein the composition comprises a SAP which forms ribbons and/or fibrils in an aqueous solution and wherein the SAP has a primary structure in which at least 50% of the amino acids comprise an alternating structure of polar and apolar amino acids.

12. (Previously Presented) The composition according to claim 11, wherein the polar amino acids include from 1 to 3 net charged amino acids per 11 amino acids.

13. – 16. (Canceled)

17. (Previously Presented) The composition according to claim 11, wherein the composition comprises a self assembling peptide (SAP) wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.

18. (Canceled)

19. (Previously Presented) The composition according to claim 11, wherein the apolar amino acids comprise phenylalanine, tryptophan, valine, leucine, isoleucine or methionine.

20. (Previously Presented) The composition according to claim 17, wherein the amino acid chain is extended to include a bioactive peptide sequence.

21. (Previously Presented) The composition according to claim 17, wherein the amino acid chain is attached to a therapeutically active molecule.

22. (Canceled)

23. (Previously Presented) The composition according to claim 11, wherein the SAP is soluble in a highly ionic medium.

24. (Previously Presented) The composition according to claim 23, wherein the SAP comprises a ratio of net charged amino acids to total amino acids of from 1:11 to 4:11.

25. – 35. (Canceled)

36. (Previously Presented) The composition according to claim 1, wherein the persistence length of the ribbons, fibrils or fibres is from 20 nm - 70 μ m.

37. (Previously Presented) The composition according to claim 36, wherein the peptide is a P11-3 variant.

38. (Previously Presented) The composition according to claim 1, wherein the composition substantially comprises ribbons, fibrils, or fibres.

39. - 40. (Cancelled)

41. (Previously Presented) The composition according to claim 38, wherein the composition substantially comprises fibrils, and wherein the fibrils are comprised in a network of fibrils interconnected at fibre-like junctions.

42. (Previously Presented) The composition according to claim 1, wherein a solution of the composition has a nematic transition occurring at $C_{IN} = 0.9$ mM.

43. (Previously Presented) The composition according to claim 38, wherein the fibrils or fibres are in the form of a nematic fluid.

44. (Previously Presented) The composition according to claim 43, wherein the nematic fluid is an elastomeric gel.

45. (Previously Presented) The composition according to claim 1, wherein the material is in the form of a tissue engineering scaffold.

46. (Previously Presented) The composition according to claim 45, wherein the scaffold is seeded with cells.

47. (Previously Presented) The composition according to claim 46, wherein the cells are ligamentum cells for growing new ligaments, tenocytes for growing new tendon, chondrocytes for cartilage, osteoblasts for bone, cardiac cells for cardiac tissue engineering, stromal cells for tissue patches, fibroblasts and keratinocytes for skin and mesenchymal stem cells for any of these applications.

48. (Previously Presented) The composition according to claim 1, wherein the composition possess one or more of high tensile strength at low weight, high modulus, high chemical resistance, high toughness, high cut resistance, low elongation to break, low thermal shrinkage, high dimensional stability, flame resistant, or self extinguishing.

49. (Previously Presented) The composition according to claim 1, wherein the fibres possess characteristics selected from the following: continuous filament yarn, high tensile strength, processable on conventional looms, twistors, cord forming, stranding and serving equipment; staple, very high cut resistance, spun on conventional cotton or worsted spinning equipment, precision cut short fibres, processable on felting and spun lace equipment; pulp-wet and dry, floc, precision cut short fibres, high surface area, miscible in blend composites, thermal resistance, excellent friction and wear resistance; cord, high tensile strength and modulus at low specific weight, retention of physical properties at high and low temperature extremes, very low

heat shrinkage, very low creep, good fatigue resistance; fabric, excellent ballistic performance at low weights; and excellent resistance to cuts and protrusion combined with comfortable wear and excellent friction and wear performance against other materials.

50. (Previously Presented) The composition according to claim 1, wherein the material comprises a skin treatment.

51. (Previously Presented) The composition according to claim 50, wherein the skin treatment comprises skincare and dermatological applications for cosmetic and/or medical treatment.

52. (Previously Presented) The composition according to claim 50, wherein the skin treatment comprises one or more of skin protection, improvement in skin feel, improvement of skin strength, increased suppleness, delivery of active or beneficial substances, moisturisation, improved appearance and/or anti-ageing effects.

53. (Previously Presented) The composition according to claim 1, wherein the composition comprises a hair care product.

54. (Previously Presented) The composition according to claim 53, wherein the hair care product improves hair condition, strength, feel, suppleness, appearance and/or moisturisation.

55. (Previously Presented) The composition according to claim 54, wherein the hair care product comprises a hair shampoo, conditioner, dye, gel, mousse and/or other dressing.

56. (Previously Presented) The composition according to claim 1, wherein the material comprises a network adapted for the delivery of perfumes, vitamins and/or other beneficial agents to the skin and/or hair.

57. (Previously Presented) The composition according to claim 56, wherein pH responsiveness is used to control delivery.

58. (Previously Presented) The composition according to claim 1, wherein the material is sterilised.

59. – 60. (Canceled)

61. (Previously Presented) A method of tissue engineering, comprising seeding the composition of claim 1 with cells.

62. (Canceled)

63. (Previously Presented) A method for bone repair comprising applying the composition of claim 1 as a scaffold.

64. – 68. (Canceled)

69. (previously presented) A method of sterilising the composition according to claim 1, comprising gamma irradiation of a dry powder of the composition.

70. (Canceled)

71. (Previously Presented) The composition according to claim 1, wherein the composition can modify wetting properties or anti-icing properties of a material, control interaction of oil/water with clay surfaces, stabilize clay, or deal with fractures in oil-wells.

72. (Previously Presented) The composition according to claim 1, wherein the composition is part of a sensor, biocatalyst or separation media in biotechnology applications.

73. (Previously Presented) The composition according to claim 1, wherein the composition is part of a bioresponsive and biocompatible surface.

74. – 75. (Canceled)

76. (Previously Presented) The composition according to claim 1, wherein the composition can serve as a template for nucleation and growth of inorganic materials.

77. - 80. (Canceled)

81. (Previously Presented) The composition according to claim 1, wherein the composition comprises continuous filament yarns, staple, floc, cord, or fabric.

82. – 95. (Canceled)

96. (Previously Presented) The composition according to claim 1, further comprising a polymer.

97. - 101. (Canceled)

102. (Previously Presented) A composition comprising:
ribbons, fibrils or fibres, wherein each of the ribbons, fibrils or fibres has an antiparallel arrangement of peptides in a β - sheet tape-like substructure at physiological pH, wherein each peptide comprises a net -2 or a +2 charge, and wherein the peptide is P11-3; and
a sodium chloride concentration equal to or about 145 mM,
wherein the composition is at a physiological pH, and wherein the peptide is at a concentration of 15 mg/ml to 35 mg/ml in the composition.

103. (Previously Presented) The composition of claim 1, wherein the pH is about 7.5.

104. (Cancelled)